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SCIENTIFIC LITERATURE.

Traité de Zoologie Concrète.—La cellule et les protozoaires. Delage et Hérouard, Paris. 1896. 527 pages; 870 illustrations.

This volume, the first of a series to be published by Delage and Hérouard, inaugurates a new departure in zoological text-books. The authors point out that the usual text-books (German and English) are not sufficiently definite and that the student, especially a beginner, has extreme difficulty in getting a mental picture of the animals which comprise any specific group. They maintain that the ordinary text-book, in dealing with such a group, introduces the subject by a few pages of comparative anatomy. The various organs and systems of organs are described for the group as a whole, but independently of any given animal, while exceptions to the common type are only casually mentioned. This introductory section is usually followed by an enumeration of the sub-divisions of the group and each subdivision is then treated in the same way as the group, beginning with the comparative anatomy, which is still vague and impersonal so far as the specific forms are concerned, and ending with a very short description of one or two characteristic genera. Nowhere in the chapter is any one animal completely described, and the student is confused by the variety of forms casually mentioned and bewildered by the numerous exceptions. Our authors regard such a text-book as 'abstract,' dealing neither with comparative anatomy nor systematic zoology but falling weakly between the two. In presenting their own 'concrete' zoology their aim is to avoid the evil above mentioned and to leave in the mind of the reader a complete mental picture of the structure of some type specimen of each group.

To take the place of the introductory sections of the usual text-books, they give a complete description of all the parts which make up a type specimen of the class or order in question. For this type specimen either some one form is chosen which represents the average of the group or an ideal form is created from the imagination. Such a form, whether imaginary or real, makes what the authors call the *morphological type* (Type morphologique). The

description of this type specimen is very complete, comprising morphology, physiology, reproduction, regeneration, etc., while copious footnotes give further and more detailed information concerning special parts or historic connections. The description of the morphological type is followed by more condensed descriptions of the common genera, while the forms which are closely related are enumerated in footnotes. By describing so many they avoid exceptions to statements and so make the way clear to the student for every form or group of forms he reads about. Five hundred and thirty genera are actually described in the text, while half that number at least are mentioned in footnotes. Each genus is accompanied by a figure, sometimes colored, in which all of the parts are shown.

Fifty-eight pages are devoted to a general consideration of the cell and its functions. Here the structure, chemical composition and physiology of the cell, including nutrition, reproduction, fertilization, etc., are described in a general way, while extended footnotes give the main points on controverted questions in cellular biology. In this portion Delage follows pretty closely the lines of his own cytological researches, and when he deviates from them he is not always happy in his guide. For example, in his extended review of Fol's principle of the Quadrille of the Centers it is difficult to see why he ignores Wilson's complete disproof, and while cognizant of Boveri's and Mathew's work on the subject comes to the conclusion that Fol may still be right.

By far the largest part of the volume is devoted to the Protozoa (470 pages), and here we find their text-book plan completely worked out, although the simplicity of structure of the Protozoa gives little opportunity for testing the value of their color scheme, according to which the various organs are depicted in specific colors.

In the classification adopted the Protozoa are divided into the usual four classes—Rhizopoda, Sporozoa, Flagellia and Infusoria. The further subdivisions are only occasionally different from the usual classification. The authors follow Lankester in giving to the Mycetozoa the same taxonomic value as the Heliozoa and

Radiolaria. To be consistent, they should follow Haeckel, who has shown conclusively that the same reasoning which draws the Mycetozoa into the protozoan group would also draw the bacteria and fungi. This, however, they decline to do, and their classification of the Rhizopods is thereby weakened. The difficulty might have been avoided by introducing the questionable forms in an appendix under some name indicating their affinities to the plants. The same criticism might apply to their order, Phytoflagellidæ. It is of value to show the connection of these plant-like forms to the Rhizopods and Flagellates, if for no other reason than to show the possible polyphyletic origin of Protozoa from Protophyta, but to make them equivalent to the well-defined animal groups seems to be a taxonomic error.

In classifying the Sporozoa the authors have left the beaten track and have taken advantage of the recent works of Labbé, Schneider and innumerable other investigators of this unfamiliar group to produce a new and apparently trustworthy classification in which the adult form is taken as the basis for the two main subdivisions—the Rhabdogeniæ (in place of Labbé's Histosporidæ and Cystosporidæ) and the Amœbogeniæ (equivalent to Bütschli's Myxosporidia).

One feature of the book which may be open to criticism is that nearly all of the figures taken from various special works are modified in some way to conform to the plan of schematization, and the reader is left with a feeling of uncertainty as to how much is real and how much imaginary, and he naturally questions the degree of accuracy with which the authors draw the line between the two.

Another and a more important criticism touches the plan of presentation which is to be followed throughout the series. While there is undoubtedly much of value in the idea of their 'concrete' zoology for teaching purposes, there are important reasons why the method they adopt cannot give complete satisfaction. For example, one cannot resist a feeling of disapproval upon seeing an *Amœba proteus* described and pictured with the long reticulate and anastomosing pseudopodia of the Foraminifera in addition to its own lobose type; nor, indeed,

a 'hypotrichous ciliate with the musculature of a heterotrichous form.' Such a method may be very successful in forcing upon the student a general idea of the group described, but the picture which he carries away with him may be of some form which does not actually exist in nature, while with that mental picture he carries a number of others which show deviations from the morphological type. It may be asked, then, if the confusion of pictures which the student gets is not as bewildering to him as the confusion of facts and exceptions in the 'abstract' type of text-book?

Finally, this work, although of undoubted value for teachers and specialists, is designed as a text-book for beginners, but, putting aside all considerations of method and merit, the mere size of any zoology which begins with 470 pages on the Protozoa and which promises to fill a large number of volumes is out of reach of the student, and he must continue to seek a text-book, probably of the 'abstract' type, which is condensed, simple, interesting and scientifically accurate.

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DEPARTMENT OF ZOOLOGY,
COLUMBIA UNIVERSITY, NEW YORK,
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Sleep: Its Physiology, Pathology, Hygiene and Psychology. By MARIE DE MANACÉINE (St. Petersburg). Contemporary Science Series. Imported by Charles Scribner's Sons, New York. 1897. Pp. 335.

This work, already published in Russian and French, now appears in English, enlarged and revised by the author herself. It is a brief and somewhat popular summary of the best that is now known about the physiology, pathology, hygiene and psychology of sleep. The author's own investigations supplement a very wide range of reading on the subject. A classified bibliography enumerates about 550 books and articles pertaining more or less directly to sleep.

The one constant physical accompaniment of sleep is arterial, particularly cerebral, anæmia, with venous congestion, particularly congestion of the vessels of the skin, with dilatation of the arms and legs. The plethysmographic experi-